



2011 SUMMARY REPORT

for the

**TOWN OF MINTO
HARRISTON DRINKING WATER SYSTEM**

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1.0 INTRODUCTION

1.1 Background

In December 2002, the Safe Drinking Water Act (SDWA) was enacted. Subsequently, on June 1, 2003, under the SDWA, a new '*Drinking-Water Systems Regulation*', Ontario Regulation 170/03 (O. Reg. 170/03), was enacted. In addition, several supporting regulations and procedures were also enacted to assist with the administration of O. Reg. 170/03. The list of relevant drinking-water legislation is presented in Appendix A.

The SDWA identifies the responsibilities of owners and operating authorities of municipal drinking water systems (SDWA, Sections 11 and 19). Their duties include ensuring that:

- All water provided by the drinking-water system meets prescribed drinking-water quality standards;
- The drinking-water system is operated in accordance with the Act and regulations and is kept in a good state of repair;
- All facilities are appropriately staffed and supervised;
- All sampling, testing and monitoring requirements are complied with;
- All reporting requirements are complied with; and
- Only persons holding valid operator's certificates operate the drinking-water-system.

O. Reg. 170/03 establishes the standard for protection of drinking water. It includes sets of Schedules, specific to municipal residential systems, that define requirements for:

- Minimum treatment levels;
- Operational checks;
- Chemical and microbiological sampling and testing;
- Adverse results reporting;
- Corrective procedures; and
- Report documentation and retention.

The system's Certificate of Approval (C. of A.) imposes system specific rules and conditions applicable to the standards set out in O. Reg. 170/03. July 31, 2011 the C of A was

revoked and adherence to the Municipal Drinking Water Licence (MDWL) and Drinking Water Works Permit (DWWP) is required.

1.2 Objective

This Harriston Drinking Water System Summary Report is being prepared in fulfillment of Schedule 22 of O. Reg. 170/03, and will be given to Members of the Municipal Council. It covers the period from January 1, 2011 to December 31, 2011.

This Summary Report lists any requirements of the Act, the regulations, the C. of A., MDWL, DWWP and any order that the system failed to meet, during the period of this report. For any such failure, the measures that were taken to correct the failure are detailed. The report also includes relevant information that will assist the members of the Municipal Council for the Town, to assess the water work's capability to meet existing and future planned uses of the system.

1.3 Description of Drinking Water System

Harriston is a community with a population of approximately 2108 persons, located within the Town of Minto within the northwest corner of Wellington County, at the intersection of Provincial Hwy. No. 9 and Hwy. No. 89.

Harriston is currently serviced by a waterworks that consists of: three drilled bedrock wells, three wellhouses, an elevated 1915 m³ steel storage tank and a distribution network of watermains, ranging in diameter from 100 mm to 250 mm. There are approximately 77 fire hydrants in the Town of Harriston. In the event of a power outage, Wellhouse #3 is equipped with automatic back-up power supply.

The bedrock wells are equipped with submersible pumps or vertical lineshaft pumps. Water from Wells #1 and #3 discharge into Wellhouse #3, and water from Well #2 discharges into Wellhouse #2, respectively, for flow measurement and treatment. In the wellhouse, the raw water supply is injected with 12% sodium hypochlorite for disinfection and the chemical PW1680, for iron sequestering.

The wells are controlled (*start/stop*) automatically, based on elevated storage tank water levels and pressures in the distribution system. Each wellhouse is equipped with alarms for chlorination system failure (*and corresponding lockout of well pumps*), low water level and intrusion. Each wellhouse has continuous monitoring analyzers for chlorine.

The treated water leaves the wellhouse and enters an underground contact pipe and is discharged into the distribution system after adequate contact time is achieved.

The Harriston Drinking Water System operates under C. of A. #6334-69AMGE until July 31, 2011 at which time operations are regulated by MDWL 106-102 and DWWP 106-202 and PTTW #8430-85KS2X.

2.0 SUMMARY OF UPGRADES

2.1 Upgrades Completed in 2011

The disinfection treatment system in the Harriston Drinking Water System meets all of the standards imposed by O. Reg. 170/03 and the MOE's "*Procedures for Disinfection of Drinking Water in Ontario*".

Typically, maintaining the system includes repairs and/or replacement of individual components as necessary. In 2011, \$1,400.00 was spent on a portable generator, \$850.00 on a metal detector and \$6,500.00 on computer equipment and upgrades between all 4 water systems.

In Harriston, approximately \$14,500.00 was spent on water tower upgrades and maintenance and \$3,300.00 in preparation for Elora St. downtown watermain replacement.

Preventative maintenance measures are being followed to ensure proper operation of the Drinking Water System.

2.2 Upgrades Scheduled to be Completed in 2012

In 2012, the Town of Minto is planning to replace watermain on George St. from Union to Maitland St. at an estimated cost of \$20,000.00 and on Queen St. behind Murphy's at an estimated cost of \$35,000.00. As well as begin the necessary preparations to replace watermain on Elora St. downtown at an estimated cost of \$5,000.00.

3.0 OPERATION OF THE DRINKING WATER SYSTEM

3.1 Summary of the Quantities and Flow Rates of Water Supplied

O. Reg. 170/03 stipulates that a summary of the quantities and flow rates of the water supplied from each of Harriston's wells be included in the Summary Report. Tables 3.1, 3.2 and 3.3 provide a summary of quantities and flow rates supplied during 2011 for Wells #1, #2 and #3 respectively, on a monthly basis. Well #1 is located in the Young Street Wellhouse, but the raw water is directed to the King Street Wellhouse for treatment. As such, raw supplies from Well #1 and Well #3 are treated in the King Street Wellhouse, and raw water supply from Well #2 is treated in the John Street Wellhouse.

Table 3.1
Harriston Drinking Water System - Well #1
Treated Water Flow, Turbidity, and Disinfectant Residual
January 1, 2011 - December 31, 2011

	Treated Water Flow (Max Flow Rate = 11.4 L/s)			Chlorine	Monthly Averages				Distribution System Disinfectant	
					Treated Water Turbidity		Treated Water Disinfectant			
Month	Instantaneous Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)	Monthly Total (L)	No. of Samples Collected	Daily Average Turbidity	No. of Treated Samples Collected	Average Residual (mg/L)	No. of Dis. Samples Collected	No. of Samples with Detectable Residual
January	10.2	295	1800	31	10	0.5	30	1.30	See Harriston Well #3 Data	
February	10.1	185	1344	20	7	0.63	27	1.35		
March	10.2	294	1457	40	9	0.67	31	1.17		
April	10.2	146	1287	20	3	0.33	29	1.28		
May	10.1	102	1256	43	5	0.49	31	1.20		
June	10.1	399	2800	40	4	0.4	29	1.23		
July	10.1	82	1165	29	3	0.44	30	1.12		
August	10.1	81	1198	33	4	0.46	31	1.10		
September	10.1	63	1071	22	5	0.53	28	1.21		
October	10.1	106	1383	50	3	0.43	30	1.36		
November	9.9	220	1246	20	4	0.38	29	1.23		
December	9.5	73	1083	20	6	0.37	31	1.22		
Total			17,090	368	63		356			
Average			1,424			0.47		1.23		
Maximum	10.2	399								

* Note: The C. of A. stipulates that the rated capacity for the maximum flow rates from the treatment system for Well #1 is 11.4 L/s.

Disinfectant Compound Used: 12% Sodium Hypochlorite

Form of Residual Displayed: Free

Quantity of Disinfectant Used During 2011: 368 L

Distribution System Target Residual: 0.2 mg/L

Table 3.2
Harriston Drinking Water System – Well #2
Treated Water Flow, Turbidity, and Disinfectant Residual
January 1, 2011 – December 31, 2011

	Treated Water Flow (Max Flow Rate = 23.9 L/s)			Chlorine	Monthly Averages				Distribution System Disinfectant	
	Average Day Flow	Maximum Day Flow	Monthly Total		Monthly Total	Treated Water Turbidity		Treated Water Disinfectant		No. of Dis. Samples Collected
Month	(L/s)	(m ³ /day)	(m ³)	(L)	No. of Samples Collected	Daily Average Turbidity	No. of Treated Samples Collected	Average Residual (mg/L)		
January	20.2	641	12439	338	7	0.64	31	1.29	See Harriston Well #3 Data	
February	20.4	660	10258	284	2	0.79	29	1.31		
March	20.5	784	11333	283	3	0.69	31	1.17		
April	20.7	1138	9508	242	5	0.85	27	1.1		
May	19.6	686	11354	357	6	0.65	32	1.26		
June	18.9	1773	12822	352	3	0.49	30	1.32		
July	18.8	414	11164	334	3	0.63	33	1.23		
August	18.7	603	11138	286	5	0.52	32	1.26		
September	18.7	800	10678	520	6	0.70	29	1.35		
October	18.5	931	12395	348	5	0.70	31	1.49		
November	18.6	434	9885	182	3	0.87	30	1.03		
December	18.7	554	10252	271	6	0.70	31	1.11		
Total			133,226	3,797	54		366			
Average			11,102			0.69		1.24		
Maximum	20.7	1,773								

* Note: The C. of A. stipulates that the rated capacity for the maximum flow rates from the treatment system for Well #2 is 23.9 L/s.

Disinfectant Compound Used: 12% Sodium Hypochlorite
 Form of Residual Displayed: Free
 Quantity of Disinfectant Used During 2011: 3,797 L
 Distribution System Target Residual: 0.2 mg/L

Table 3.3
Harriston Drinking Water System - Well #3
Treated Water Flow, Turbidity, and Disinfectant Residual
January 1, 2011 - December 31, 2011

	Treated Water Flow (Max Flow Rate = 18.9 L/s)			Chlorine	Monthly Averages				Distribution System Disinfectant	
	Instantaneous Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)		Monthly Total (L)	Treated Water Turbidity		Treated Water Disinfectant		No. of Dis. Samples Collected
No. of Samples Collected				Daily Average Turbidity		No. of Treated Samples Collected	Average Residual (mg/L)			
January	17.4	692	15565	327	13	0.47	31	1.20	42	42
February	17.4	879	16628	340	12	0.47	29	1.18	44	44
March	17.5	793	16660	320	18	0.37	31	1.26	46	46
April	17.2	870	16433	356	19	0.41	30	1.43	44	44
May	16.5	776	16319	328	9	0.42	29	1.34	44	44
June	16.4	1140	19036	422	16	0.44	29	1.32	41	41
July	16.7	1069	23343	540	3	0.50	13	1.30	43	43
August	16.6	1124	20463	403	0		0	0.00	0	0
September	16.6	801	16552	420	0		0	0.00	0	0
October	16.9	702	15517	297	4	0.30	32	1.25	43	43
November	16.6	877	16707	334	7	0.29	30	1.30	45	45
December	16.4	772	17161	272	11	0.24	29	1.28	44	44
Total			210,384	4,359	112		283		436	436
Average			17,532			0.39		1.07		
Maximum	17.5	1,140								

* Note: The C. of A. stipulates that the rated capacity for the maximum flow rates from the treatment system for Well #3 is 18.9 L/s.

Disinfectant Compound Used: 12% Sodium Hypochlorite
 Form of Residual Displayed: Free
 Quantity of Disinfectant Used During 2011: 4,359 L
 Distribution System Target Residual: 0.2 mg/L

Table 3.4
Harriston Drinking Water System – Well #1 & 3 Combined
Treated Water Flow
January 1, 2011 – December 31, 2011

Month	Treated Water Flow (Max Daily Volume = 1309 m ³ /d) (Max Flow Rate = 15.2 L/s)			Chlorine
	Instantaneous Peak flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)	Monthly Total (l)
January	27.6	692	17365	358
February	27.5	879	17972	360
March	27.6	793	18117	360
April	27.4	870	17720	376
May	26.6	776	17575	371
June	26.5	1140	21836	462
July	26.9	1069	24508	569
August	26.7	1124	21661	436
September	26.7	801	17623	442
October	27.0	702	16900	347
November	26.5	877	17953	354
December	25.9	772	18244	292
Total			227,474	4,727
Average			18,956	
Maximum	27.6	1,140		

3.2 Comparison of Actual Flow and Maximum Allowable Rates

O. Reg. 170/03 stipulates that a summary of the quantities and flow rates of the water supplied from each of Harriston’s wells be included in the Summary Report and compared against the rated capacity and flow rate for the system. As such, a comparison of the instantaneous peak flow to the C. of A’s rated capacity is included and a comparison of the maximum daily flow to the PTTW’s rated capacity is included in Table 3.5. Table 3.4 reflects the comparisons between the MDWL and PTTW as of July 31, 2011. However, this table includes data from January 1st to December 31st, 2011.

Table 3.5
Comparison of Flow Rates and Flow Capacities
To
Rated Flow Rate (C. of A.) and Rated Capacity (PTTW)

Well Supply	C. of A. Max. Flow Rate	Instantaneous Peak Flow	Percent of Maximum Allowable	PTTW Maximum Daily Quantity	Maximum Daily Flow	Percent of Maximum Allowable
	L/s	L/s	%	m ³ /day	m ³ /day	%
Well #1	11.4	10.2	89	981	399	41
Well #2	23.9	20.7	87	2,100	1,773	84
Well #3	18.9	17.5	93	1,600	1,140	71

The C. of A. stipulates, “*The drinking-water system shall not be operated to exceed the rated capacity for the maximum flow rates into the treatment system*”. The wells have fixed speed pumps that typically discharge at constant rate equal to the average rate identified in the PTTW.

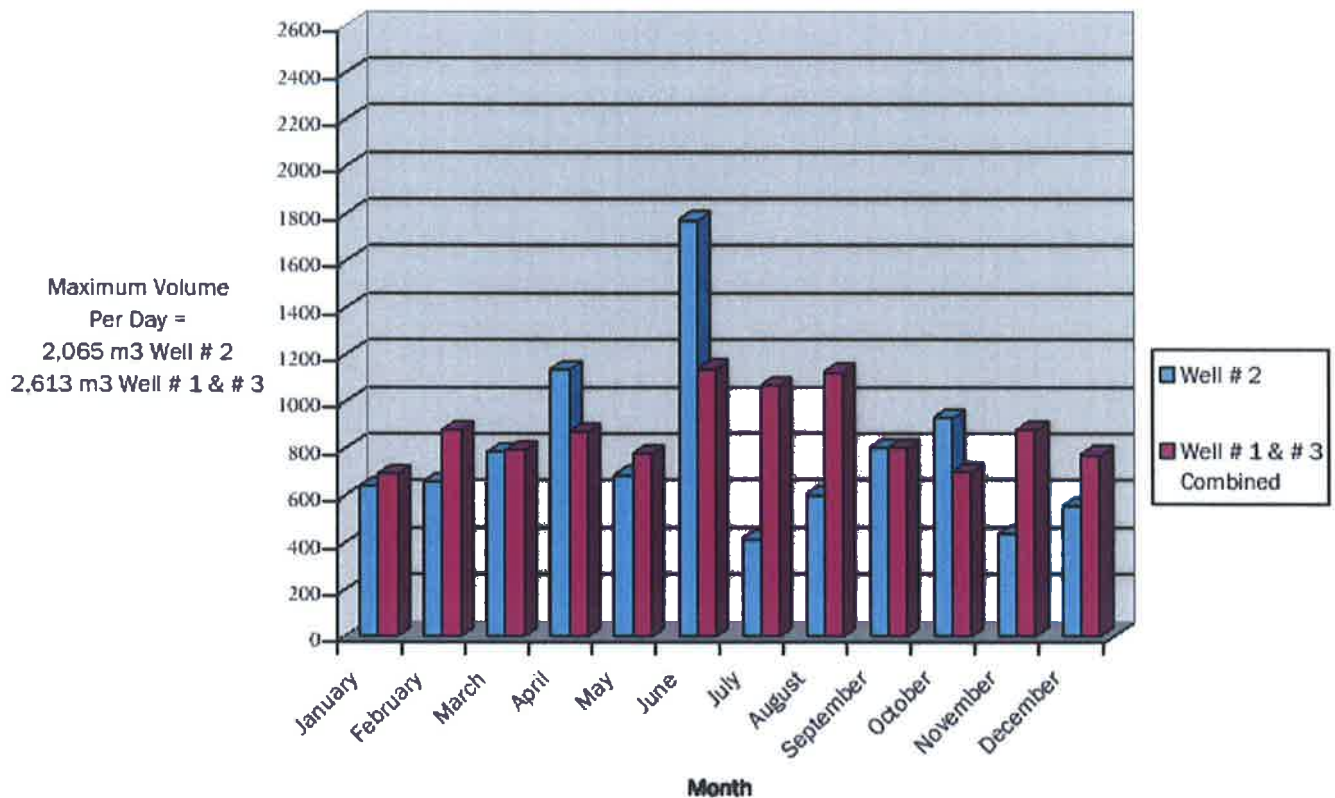
Table 3.6
Comparison of Flow Rates To Rated Flow Rate (PTTW)

Well Supply	PTTW Max. Flow Rate	Maximum Instantaneous Peak Flow	Percent of Maximum Allowable
	L/s	L/s	%
Well #1	11.3	10.2	90
Well #2	23.9	20.7	87
Well #3	18.9	17.5	93

Table 3.7
Comparison of Flow Capacities To Rated Capacity (MDWL)

Well Supply	PTTW Maximum	Maximum Daily Flow	Percent of Maximum Allowable
	m ³ /day	m ³ /day	%
Well #1	2,065	1,773	86
Well #1 & # 3	2,613	1,140	44

Table 3.8
Maximum Water Usage Per Day by Month



The C of A is valid until July 31, 2011. As of August 1, 2011 the Municipal Drinking Water Licence does not list a flow rate, therefore the flow rate is based on the PTTW.

Short-term peaks, in excess of permitted values, may occur at pump start up, while doing specific maintenance procedures or during emergency demand situations. An occurrence of this nature is not considered an exceedance.

The time and duration of any flow exceedance is recorded for each event along with the reason for the occurrence. There were no exceedances of the allowable flow rates in the Harriston Drinking Water System.

3.3 Raw Water Quality and Required Treatment

The Harriston Drinking Water System has one naturally occurring chemical parameter that exceeds MAC or IMAC limits; it is iron. The Harriston Drinking Water System uses PW1680 to improve the disinfection process by removing the level of naturally occurring iron in the water.

The Harriston Drinking Water System utilizes continuous monitoring analyzers for free chlorine residual. The chlorine analyzer is equipped with an alarm. In the event of an adverse chlorine residuals reading, a signal is sent to the SCADA system, which in turn,

shuts down the respective well pump. The average monthly turbidity and free chlorine residual measurements for treated water are presented in Tables 3.1, 3.2 and 3.3 for Well #1, Well #2 and Well # 3, respectively.

There were no high turbidity readings (>1.0 NTU) experienced during 2011. The minimum, maximum and average turbidity readings for raw water from each well are presented in Table 3.9.

12% sodium hypochlorite is the disinfectant used. Free chlorine residual is monitored continuously at the “Point of Entry” (POE) into the distribution system. Additional “grab samples” are taken daily (excluding weekends and holidays) within the distribution system and tested for the free chlorine residual. The minimum, maximum and average values of free chlorine residual at the POE are presented Table 3.5. Also included in Table 3.5 is the range of free chlorine residual within the distribution system.

The free chlorine residual in the distribution system ranged between 0.44 mg/L and 1.61 mg/L. O. Reg. 170/03, Schedule 1-2 stipulates that the free chlorine residual can never be less than 0.05 mg/L. In addition, O. Reg. 170-03, Schedule 1-4 stipulates that the water treatment equipment must be “...capable of achieving, at all locations within the distribution system, a free chlorine residual of 0.2 mg/L ...”. The Harriston Drinking Water System meets both of these requirements.

Table 3.9
2011 Annual Summary of
Raw Water Turbidity and Free Chlorine Residual
for Harriston Drinking Water System

Location	Range	Raw Water Turbidity	Free Chlorine Residual at POE
		NTU	mg/L
Well #1	Minimum	0.04	0.77
	Maximum	0.83	1.73
	Average	0.47	1.23
Well #2	Minimum	0.01	0.76
	Maximum	0.93	1.78
	Average	0.42	1.24
Well #3	Minimum	0.02	0.69
	Maximum	0.87	1.85
	Average	0.42	1.31

3.4 Summary of Treatment Chemicals Used

The disinfectant chemical used in the Harriston Drinking Water System is 12% Sodium Hypochlorite. Measurements of free chlorine are recorded on a continuous basis. In 2011, 4,165 L of 12% Sodium Hypochlorite was used. The average dosage rates are presented in Table 3.10.

In 2011, 1,029 L of PW1680 was used for the sequestering of iron. Wells #1 and #3 share a common tank of PW1680. The average dosage rates are presented in Table 3.10.

Table 3.10
2011 Annual Summary of
Treatment Chemicals Used
for Harriston Drinking Water System

Treatment Chemical	Well	Volume Used	Mass Used	Annual Flow	Dosage Rate
		L	kg	m ³	mg/L
12% Sodium Hypochlorite	Well #1	368	44.2	17090	2.58
	Well # 2	3797	455.6	133226	3.42
	Well # 3	4359	523.1	210384	2.49
	Total	4,165	499.8	360,700	1.39
PW1680	Well #1 & Well #3	331	460.1	227474	2.02
	Well # 2	698	970.0	133226	7.28
	Total	1,029	1,430.1	360,700	3.96

Note: • 12% Sodium Hypochlorite = 120,000 mg/L = 120 kg/m³
 • PW1680 has a specific gravity = 1.4

4.0 COMPLIANCE

4.1 Assessment of Compliance

The objective of the Summary Report is to list any requirements of the Act, the regulations, the C. of A. and any MOE order that the system failed to meet from January 1, 2011 to December 31, 2011, and the corresponding corrective measure(s) taken. Compliance was assessed as follows:

- There were no MOE Orders issued to the Harriston Drinking Water System in 2011.
- The C. of A. imposes the specific rules and conditions governing the standards set out in O. Reg. 170/03. It is an important instrument in defining the requirements of

compliance of a Drinking Water System. A detailed 'checklist' was developed, based on the terms and conditions of C. of A. #6334-69AMGE for the Harriston Drinking Water System. From this checklist, the terms and conditions of the C. of A. were summarized as either in compliance or not in compliance. A copy of both the summary and the checklist are included in Appendix B.

- O. Reg. 170/03 establishes the standard for protection of drinking water; specifically, through 12 schedules that municipal residential drinking systems must follow to meet the requirements of the regulation. A detailed 'checklist' was developed for each of the relevant schedules for municipal residential systems. This checklist was then summarized into requirements that have been met, and those that have not been met, for each of the schedules. A copy of both the summary and the checklist are included in Appendix C.
- The SDWA identifies the responsibilities of owners and operating authorities of municipal drinking water systems. It places a recommended statutory standard of care on those who have oversight of municipal drinking-water systems. In essence, the standard of care has two themes: be informed and exercise diligent oversight.

4.2 Summary of Compliance

To the best of our knowledge and ability we are in, or diligently working towards, compliance with all of the requirements of the SDWA, O. Reg. 170/03, as well as the Harriston Water Work's C. of A. #6334-69AMGE and PTTW #8430-85KS2X. Every attempt has been made to ensure this document is an accurate representation of how the Drinking Water System is operated. On July 31, 2011 the C of A was replaced with the Municipal Drinking Water Licence 106-102 and Drinking Water Works Permit 106-202.

To the best of our knowledge, Table 4.1 identifies all of the requirements of the SDWA, the regulations, the C. of A., and the PTTW, in which the Harrison Drinking Water System system failed to meet from January 1, 2011 to December 31, 2011.

**Table 4.1
 HARRISTON DRINKING WATER SYSTEM
 Requirements the System Failed to Meet**

Compliance With	Description of Item the System Failed to Meet	Correction of This Situation How/When
C. of A. – #6334-69AMGE	<i>Harriston Drinking Water System is in compliance with all of the requirements of the C. of A.</i>	
MDWL # 106-102 As of July 29, 2011	<i>Harriston Drinking Water System is in compliance with all of the requirements of the MDWL</i>	

Compliance With	Description of Item the System Failed to Meet	Correction of This Situation How/When
<p>DWWP # 106-202 As of July 29, 2011</p>	<p><i>Harriston Drinking Water System is in compliance with all of the requirements of the DWWP</i></p>	
<p>O. Reg. 170/03</p>	<p>The microbiological sample collected on December 6, 2010 was taken and was picked up by their courier service to be delivered to their lab on December 7, 2010 but because of a snow storm the roads were closed and their sample was not delivered by their courier in time to meet the laboratory's time requirements for microbiological sampling. The Town was notified by their lab that their sample could not be used and a resample was taken on December 9, 2010. This sample was driven to the lab by the Town of Minto staff. The Town of Minto staff sampled for their next weekly treated sample on December 13, as scheduled. However, because of having to resample because of weather conditions, the days between the December 9 sample and December 13 sample was only 4 days. Schedule 6 in O.Reg. 170/03, requires that the owner ensure that a weekly sample be taken at least five days and not more than 10 days apart from the previous week's sample.</p>	<p>The Town of Minto should ensure that if a sample has to be taken on a day other than on their scheduled day because of an unforeseen circumstance that, if possible, their next sample date be staggered to meet the legislative requirements of Schedule 6. It is recommended that the standard operating procedure for sampling be amended to reflect this.</p>
<p>SDWA</p>	<p><i>Harriston Drinking Water System is in compliance with all of the requirements of the SDWA</i></p>	

Dated this 20th day of March 2012.



Brian Hansen
 Public Works Director